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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,680	07/17/2002	Christine Engel	10191/2217	3823

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EXAMINER


JAGAN, MIRELLYS

ART UNIT	PAPER NUMBER
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2859

DATE MAILED: 02/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/069,680	Applicant(s) ENGEL ET AL.	
	Examiner Mirellys Jagan	Art Unit 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-19, 21 and 24-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-19, 21 and 24-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an application (10030354.4) filed in Germany on 6/21/00. It is noted, however, that the International Bureau has not filed a copy of the certified copy of the application (PCT Rule 17.2(a)).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 14-18, 21, and 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over British Patent 900774 to Siemens in view of U.S. Patent 4,336,215 to Yajima et al [hereinafter Yajima].

Siemens discloses a thermocouple comprising a first (10) and a second (11) element, wherein:

the first element and the second element are in contact with each other in an area (8) of at least one contact point,

at least in one vicinity of the contact point the first element includes a first ceramic material and the second element includes a second ceramic material that may be the same or different from the first ceramic material, wherein the material of the first element and the second

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element have an at least approximately equal thermal expansion coefficient at least in the vicinity of the contact point when the first and the second materials are the same,

a material of the first element and the second element are configured so that at the contact point one of a contact voltage occurs in accordance with a Seebeck effect and a temperature change occurs in response to an impressed external electric current in accordance with a Peltier effect,

the first and the second elements are electrically interconnected with one of a device configured to measure the contact voltage and a device configured to impress an external electric current flowing through the contact point, and

at least one of the first and the second ceramic material includes at least one temperature-resistance electrically semiconductive filler material (see figure 3, page 2, lines 81-90, page 3, lines 21-28, and page 4, lines 1-37).

Siemens does not disclose the filler material being one of Cr_3C_2 , TiN, FeCr, FeCrNi, ZrN, ZrC, and graphite; at least one of the first and the second ceramic materials being obtained by pyrolysis of one of a polymeric precursor material and a polymeric precursor material that includes at least one filler material; at least one of the first and the second ceramic materials including one of SiC, SiCN, SiTiCO, SiCO, SiBCN, SiBCO, BCN, SiAlCO, SiAlNCO, and SiCON compounds; or the first ceramic material being obtained by pyrolysis of one of a first polymeric precursor material and a first polymeric precursor material that includes at least one first filler material, and the second ceramic material being obtained by pyrolysis of one of a second polymeric precursor material and a second polymeric precursor material that includes at

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least one second filler material, wherein the first and second precursor materials undergo approximately equal shrinkage in the vicinity of the contact point in response to pyrolysis.

Yajima discloses a ceramic component having a ceramic composite material containing a filler material. The ceramic material is obtained by pyrolysis of a polymeric precursor material such as SiC that includes at least one filler material such as a carbide or a nitride (which can have approximately metallic conductivity or electrical semiconductivity). The ceramic material such as SiC is obtained by pyrolysis of a polymeric precursor material that may include at least one filler material, wherein the ceramic material is a powdered form that may be molded into any desired shape. Yajima teaches that the ceramic material has excellent mechanical strength and corrosion-resistant properties that are useful for making a thermocouple (see column 6, lines 32-56; and column 11, lines 21-25 and 46-47).

Referring to claims 14 and 29, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the thermocouple disclosed by Siemens by replacing the ceramic material(s) used to make the thermocouple with a ceramic material(s) as taught by Yajima, in order to provide a thermocouple having mechanical strength and corrosion-resistant properties to extend the life of the thermocouple.

Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the thermocouple disclosed by Siemens and Yajima by using ZrC as a carbide material, or TiN or ZrN as a nitride material, in order to utilize materials that may be readily available to a user and since the particular type of carbide or nitride material used to make ceramic material is only considered to be the use of a "preferred" or "optimum" material out of a plurality of well known materials that a person having ordinary skill in the art at

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the time the invention was made would have been able to provide based on the intended use of applicant's apparatus, i.e., suitability for the intended use of applicant's apparatus, which in this case is to provide a ceramic having thermoelectric properties. See *In re Leshin*, 125 USPQ 416 (CCPA 1960), where the courts held that a selection of a material on the basis of suitability for intended use of an apparatus would be entirely obvious.

Referring to claim 28, Siemens and Yajima disclose that the ceramic materials have very low thermal expansion characteristics. Therefore, approximately equal shrinkage will occur in response to pyrolysis.

Further referring to claim 29, in creating the thermocouple disclosed by Siemens and Yajima as stated above, the method steps of claim 29 will inherently be followed.

4. Claims 14-19, 21, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 2,981,775 to Bachman in view of Yajima.

Bachman discloses a thermocouple comprising a first (31) and a second (32) element, wherein:

the first element and the second element are in contact with each other in an area of at least one contact point,

at least in one vicinity of the contact point the first element includes a first ceramic material and the second element includes a second ceramic material that is different from the first ceramic material and a solderable metal (wire),

a material of the first element and the second element are configured so that at the contact point a contact voltage occurs in accordance with a Seebeck effect,

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the first and the second elements are electrically interconnected with a device configured to measure the contact voltage, and

at least one of the first and the second ceramic materials includes at least one electrically semiconductive filler material (see figures 2 and 3, and column 3, lines 20-69).

Bachman does not disclose the filler material being one of Cr_3C_2 , TiN, FeCr, FeCrNi, ZrN, ZrC, and graphite.

Yajima discloses a ceramic component having a ceramic composite material containing a filler material. The ceramic material is obtained by pyrolysis of a polymeric precursor material such as SiC that includes at least one filler material such as a carbide or a nitride (which can have approximately metallic conductivity or electrical semiconductivity). The ceramic material such as SiC is obtained by pyrolysis of a polymeric precursor material that may include at least one filler material, wherein the ceramic material is a powdered form that may be molded into any desired shape. Yajima teaches that the ceramic material has excellent mechanical strength and corrosion-resistant properties that are useful for making a thermocouple (see column 6, lines 32-56; and column 11, lines 21-25 and 46-47).

Referring to claims 14 and 29, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the thermocouple disclosed by Bachman by replacing the ceramic material(s) used to make the thermocouple with a ceramic material(s) as taught by Yajima, in order to provide a thermocouple having mechanical strength and corrosion-resistant properties to extend the life of the thermocouple.

Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the thermocouple disclosed by Bachman and Yajima by

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using ZrC as a carbide material, or TiN or ZrN as a nitride material, in order to utilize materials that may be readily available to a user and since the particular type of carbide or nitride material used to make ceramic material is only considered to be the use of a “preferred” or “optimum” material out of a plurality of well known materials that a person having ordinary skill in the art at the time the invention was made would have been able to provide based on the intended use of applicant’s apparatus, i.e., suitability for the intended use of applicant’s apparatus, which in this case is to provide a ceramic having thermoelectric properties. See *In re Leshin*, 125 USPQ 416 (CCPA 1960), where the courts held that a selection of a material on the basis of suitability for intended use of an apparatus would be entirely obvious.

Further referring to claim 29, in creating the thermocouple disclosed by Bachman and Yajima as stated above, the method steps of claim 29 will inherently be followed.

Response to Arguments

5. Applicant's arguments with respect to claims 14-19, 21, and 24-29 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents disclose a thermoelectric element:

U.S. Patent 5,009,717 to Komabayashi et al

U.S. Patent 4,477,686 to Nakajima et al

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this

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Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 703-305-0930. The examiner can normally be reached on Monday-Thursday from 8AM to 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 703-308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

mj
January 20, 2004



Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800